

**Electricity metering equipment (a.c.) -
Severity levels, immunity requirements and test methods for conducted
disturbances in the frequency range 2 kHz -
150 kHz**

Équipement de comptage d'électricité
(c.a.) – Niveaux de sévérité, prescriptions
d'immunité et méthodes d'essai pour les
perturbations conduites dans le domaine
de fréquence de 2 kHz à 150 kHz

Wechselstrom-Elektrizitätszähler -
Prüfschärfe, Störfestigkeit und
Prüfverfahren für leitungsgeführte
Störgrößen im Frequenzbereich von 2 kHz
bis 150 kHz

This Technical Report was approved by CENELEC on 2012-06-04.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Contents

Page

Foreword	- 3 -
Introduction.....	- 4 -
1 Scope.....	- 5 -
2 Normative references	- 5 -
3 Terms and definitions	- 5 -
4 General	- 6 -
5 Test equipment.....	- 7 -
5.1 Test generator for the disturbing current.....	- 7 -
5.1.1 General	- 7 -
5.1.2 Example of a test generator for the disturbing current.....	- 7 -
5.2 Generator for 50 Hz current and voltage.....	- 8 -
5.2.1 General	- 8 -
5.2.2 Example for a testing circuit	- 9 -
6 Test sequence.....	- 9 -
7 Performance criteria — Performance criteria for electricity meter as described in EN 50470-1 and EN 50470-3	- 10 -
Annex A (informative) Example for a realised test set-up — Setup schematic	- 11 -
Bibliography.....	- 12 -

Foreword

This document (CLC/TR 50579:2012) has been prepared by CLC/TC 13 "Equipment for electrical energy measurement and load control".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Introduction

This Technical Report specifies immunity levels and standard testing procedure for the immunity against symmetric currents in the frequency range from 2 kHz to 150 kHz as an extension of the harmonised standards EN 50470-1 and EN 50470-3 until the basic standards IEC 61000-x-x are in force.

This Technical Report was requested by various approval bodies and utilities as a temporary solution, since accuracy problems with electricity meters were observed in presence of disturbing currents in the frequency range from 2 kHz to 150 kHz. Up to date no standards are available for this frequency range.

The testing against symmetrical currents is not yet a part of the actual basic standards or product standards in EMC. However for some electricity meters an influence of symmetric currents has been shown in various investigations. The source of these currents in a frequency range from 2 kHz to 150 kHz can be a photovoltaic inverter or other switched mode power supplies.

1 Scope

This European Technical Report applies to newly manufactured static watt-hour meters intended for residential, commercial and light industrial use, of class indexes A, B and C, for the measurement of alternating current electrical active energy in 50 Hz networks. It specifies particular requirements and immunity test for direct connected and transformer connected electricity meters as an extension for EN 50470-1 and EN 50470-3. The tests are designed to achieve immunity against disturbing currents of up to 2 A (2 kHz-30 kHz) and up to 1 A (30 KHz-150 kHz) for direct connected meters and 2 % I_{max} (2 kHz-30 kHz) and 1 % I_{max} (30 KHz-150 kHz) for transformer connected meters.

It applies to static watt-hour meters for indoor and outdoor application, consisting of a measuring element and register(s) enclosed together in a meter case.

If the meter has (a) measuring element(s) for more than one type of energy (multi-energy meters), or when other functional elements, like maximum demand indicators, electronic tariff registers, time switches, ripple control receivers, data communication interfaces etc. are enclosed in the meter case (multi-function meters) then this Technical Report applies only for the active energy metering part.

This Technical Report distinguishes between:

- meters of class indexes A, B and C;
- direct connected and transformer operated meters;

It does not apply to:

- watt-hour meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems);
- portable meters;
- reference meters.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50470-1, *Electricity metering equipment (a.c.) — Part 1: General requirements, tests and test conditions — Metering equipment (class indexes A, B and C)*

EN 50470-3:2006, *Electricity metering equipment (a.c.) — Part 3: Particular requirements — Static meters for active energy (class indexes A, B and C)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 equipment under test (EUT)

electricity meter or other instrumentation for the measurement of energy which is tested against the disturbing current described in this Technical Report